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14. ABSTRACT
The capabilities of the SLICE model can complement the SCRIPPS existing suite of mine burial prediction models by extending the applicability to water depths of 30 m and beyond. Inclusion of SLICE would extend the offshore range of the mine burial model by: a) simulating effects of external sediment sources (i.e. longshore convergence, river plume etc.) b) providing time-varying grain size distributions and c) providing predictions of the variable currents needed as input into the SCRIPPS local scour model when measurements are not available. The goal of this project is to combine the SLICE model with the SCRIPPS suite of models to provide the above mentioned enhanced capabilities.

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Extending the Useful Range of Mine Burial Predictions

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LONG TERM GOAL

The capabilities of the SLICE model can complement the SCRIPPS existing suite of mine burial prediction models by extending the applicability to water depths of 30 m and beyond. Inclusion of SLICE would extend the offshore range of the mine burial model by: a) simulating effects of external sediment sources (i.e. longshore convergence, river plume etc.) b) providing time-varying grain size distributions and c) providing predictions of the variable currents needed as input into the SCRIPPS local scour model when measurements are not available. The goal of this project is to combine the SLICE model with the SCRIPPS suite of models to provide the above mentioned enhanced capabilities.

OBJECTIVES

The objective of the project is to develop a link between the two models, SLICE and the SCRIPPS local scour model and demonstrate the capabilities of the combined model by simulating conditions at a representative site.

APPROACH

The approach is divided into four steps. First, the structure of the models is reviewed and a methodology is developed for combining the models. Although these models use the same computer language (Fortran 77), they have been developed independently and have different numerical characteristics. A step-wise process has been developed, in coordination with Dr. Scott Jenkins, that will eventually lead to full integration of the codes. The models will be sufficiently integrated in this task so that a working demonstration package can be applied to field examples. We have selected two study areas to test the linked models. We will configure the SLICE model, obtain available data and operate both model sets for approximately a 6 month simulation at each site. We will prepare a final report documenting the project work. Additionally, three-dimensional static and animated views of the mine burial during the test simulations will be developed and provided with the final report on a CD.

WORK COMPLETED

In reviewing the model structures it was determined that the transfer of information between the two models could be accomplished without the need to do any incremental streaming of data between

models. We can run SLICE first and provide the required sedimentation data in the region of interest and provide the output from SLICE as input into the SCIRPPS model.   This approach is the least intrusive to both model codes. The next issue in the integration plan concerns the cross-shore region covered by each model. The SCRIPPS model currently is limited to the 10 meter or less water depth. However, the current version of SLICE can simulate the entire shoreface, including the nearshore region up to and the surf zone. Thus, there is an over lap in the spatial domain. Two options were considered. In the first approach, the SLICE model will be modified to include the surf zone and then used to predict sedimentation/currents for the whole region. In this approach, we would not use the SCRIPPS nearshore sedimentation model. An alternate approach is to use SLICE for the whole region, but then track the cross shore transport and net flux into the nearshore region, inside of some specified depth. We would then provide the SCRIPPS model the net fluxes (along-shore and cross-shore within some specified water depth), as well as sedimentation outside of the specified water depth. The first approach was determined to be the most efficient for both models and has been used.

RESULTS

The SLICE model has been successfully modified to represent the surf zone sediment transport processes using the wave transformation model of Dally and Dean (1986). The model has compared well against test cases in the literature and can provide cross-shore currents, longshore currents and sediment transport from the surf zone out to and beyond 30 meter water depths.

We have selected two nearshore sites in Korea, near river mouths, as representative cases of interest to the Navy. These sites will be simulated with the combined model to demonstrate the combined model capabilities. We are currently obtaining the required model input data form the site.

IMPACT AND APPLICATIONS

The combined model will extend the of the Navy's mine burial prediction capabilities to a larger range of depths, and regions in which sedimentation due to external sediment sources such as rivers may be important.

TRANSITIONS

The completed combined model capabilities will be used to provide input for developing Navy operational programs.

RELATED PROJECTS

The work completed here is closely related to the developmental and applied work being conducted at SCRIPPS by Dr. Scott Jenkins.

REFERENCES AND PUBLICATIONS

Dally, W.R., R.G. Dean and R.A. Dalrymple, 1986. A Model for Breaker Decay on Beaches, in *Proceedings of the 19th International Conference on Coastal Engineering.* Vol. 1, pp. 82-98, American Society of Civil Engineers, New York, 1985.